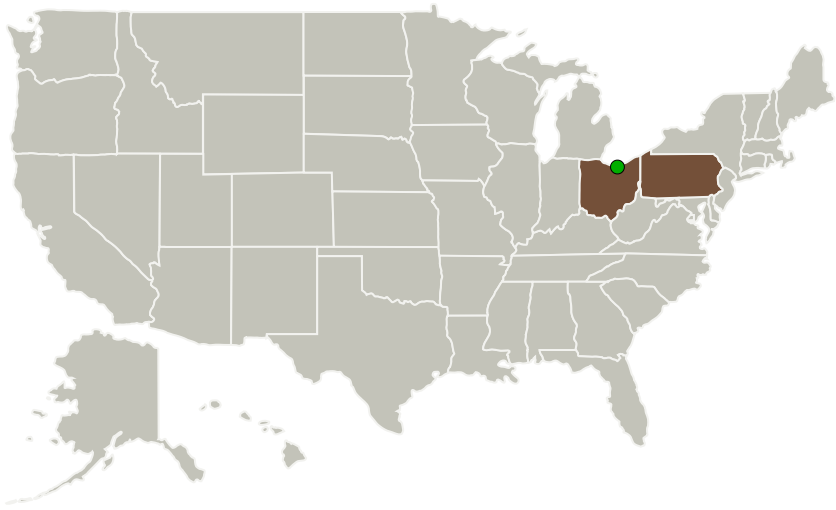
Wideband Single Crystal Transducer for Bone Characterization, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

TRS Technologies proposes to develop a very wideband ultrasound diagnostic tool for quantification of trabecular bone properties for astronauts in long term space missions. Loss of calcification in bones and general loss of strength must be monitored in missions to insure personnel health, however, there are currently limited non-invasive methods that can do this. Research has shown that different parameters of bone health can be elucidated from ultrasound characteristics at different frequencies, and the goal of TRS is to make a device that can produce the nearly 5 octave range necessary to evaluate these parameters. TRS will utilize PMN-PT single crystal piezoelectrics, which have inherent advantages over traditional materials, and integrate this with photolithographic micromachining methods to produce a device with high sensitivity and bandwidth that surpasses other systems. Bone scans will be used to show both the resolution and depth of penetration characteristics of the device and its applicability for future in vivo use in space.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
TRS Ceramics, Inc.	Lead Organization	Industry	State College, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

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Primary U.S. Work Locations	
Ohio	Pennsylvania

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140220)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

TRS Ceramics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

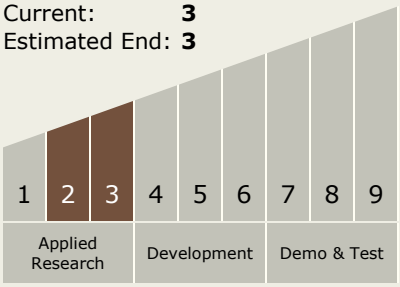
Carlos Torrez

Principal Investigator:

Kevin A Snook

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.1 Medical Diagnosis and Prognosis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System